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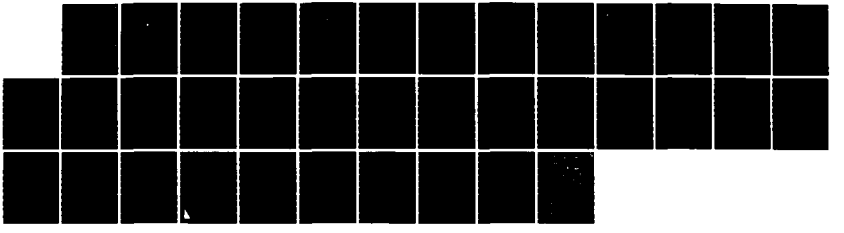

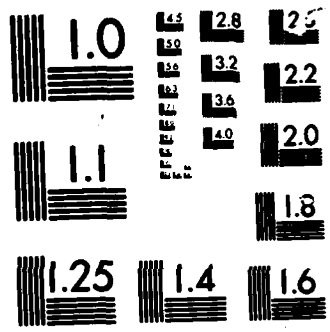

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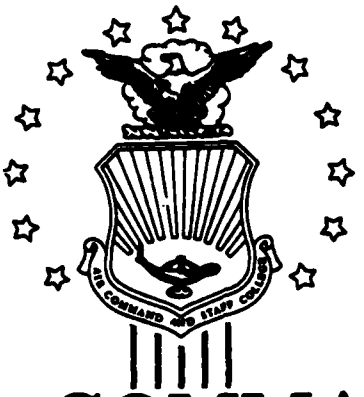


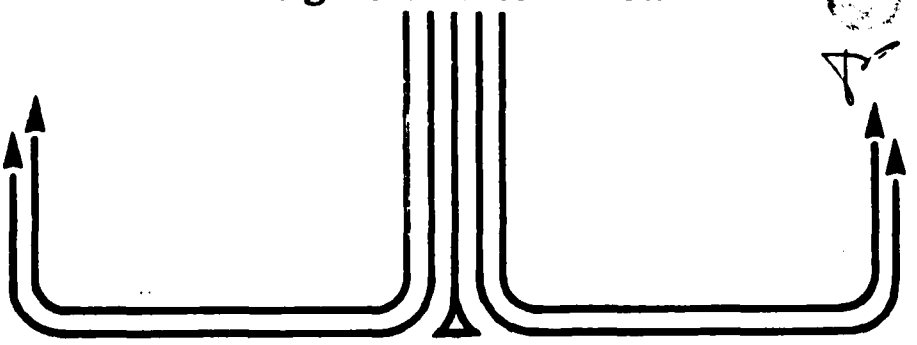
AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

EVALUATION OF THE 1984 CHANGES TO THE SPARE PARTS STOCKAGE POLICY

Major Ronald L. Forest 86-0880

"insights into tomorrow"



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The Air Force made four changes to the spare parts stockage policy in 1984 that were recommended by the Air Force Logistics Management Center. The author evaluated the four changes and found that they are beneficial to the Air Force and should be retained. A secondary finding is the need for the Air Force to better control future major supply policy changes. Positive program control, clear instructions to the field, and better information flow would enhance future supply policy changes. The author used AFLMC reports to identify the policy changes and monthly supply data from the field (MICAP and Major to compare supply performance before and after the changes.

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Submitted to the faculty in partial fulfillment of requirements for graduation.

AIR COMMAND AND STAFF COLLEGE
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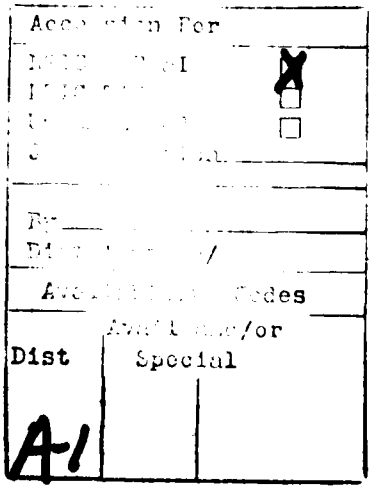
PREFACE

This study will be published as an Air Force Logistics Management Center (AFLMC) report.

The purpose of this study is to document the results of FY84's supply stockage policy changes and to analyze the Air Force's ability to manage stockage policy changes. The Air Force Logistics Management Center recommended the four changes considered in this study and projected resulting cost and benefits. This study will identify the policies and compare projections with actual cost and benefits. The changes are significantly improving supply support and the results were accurately predicted by the Air Force Logistics Management Center. Therefore, future Air Force Logistics Management Center supply recommendations should be favorably considered. The author did find a need to improve the policy change procedure and made specific recommendations in Chapter Three.

The author would like to recognize the assistance of two individuals without whom this project would have been impossible. First, I would like to thank the project sponsor, Lieutenant Colonel Doug Blazer, Chief, Stockage Policy and Analysis Division, Air Force Logistics Management Center. Also the guidance and suggestions of Captain Martha Ham were critical to this project.



ABOUT THE AUTHOR

Major Forest was commissioned through ROTC in 1972, after which he was assigned to Undergraduate Pilot Training. Upon completion, he attended Combat Crew Training as a KC-135 copilot at Castle AFB, California. His first operational assignment began in 1973 at Grissom AFB, Indiana as a copilot. He upgraded to aircraft commander in the KC-135 in 1975 and left the Air Force in 1977. In 1979, Major Forest returned to the Air Force as a KC-135 aircraft commander at Blytheville AFB, Arkansas. He soon upgraded to instructor pilot and became the executive officer for the 97th Bombardment Wing. In 1982 he was reassigned to NATO Air Base Geilenkirchen, West Germany where he worked in current operations, the command post, and became Chief of Aircrew Support. He assumed his present status as an ACSC student in August, 1985.

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Part of our College mission is distribution of the students' problem solving products to DoD sponsors and other interested agencies to enhance insight into contemporary, defense related issues. While the College has accepted this product as meeting academic requirements for graduation, the views and opinions expressed or implied are solely those of the author and should not be construed as carrying official sanction.

"insights into tomorrow"

REPORT NUMBER 86-0880

AUTHOR(S) MAJOR RONALD L. FOREST, USAF

TITLE EVALUATION OF THE 1984 CHANGES TO THE SPARE PARTS STOCKAGE POLICY

I. Purpose: To determine if the stockage policy changes made in 1984 are performing as predicted.

II. Problem: The Air Force Logistics Management Center was tasked to make recommendations to the Air Staff to improve overall supply performance. The Air Staff implemented four of the recommendations based on projected cost estimates and benefits. Now that the changes have been in effect for about a year and a half, the Air Staff wants a report on the progress.

III. Data: The author secured the Air Force Logistics Management Center reports on each of the four recommended stockage policy changes. This report provides clear statements of the old policy, new policy, background information, cost estimates, and projected benefits to be used as bench marks. All projections were combined in one list to get comprehensive numbers to compare with actual cost and benefit numbers. The author then secured actual data from monthly Worldwide Supply Performance Reports and Consolidated Stock Fund Data Reports. Data from fiscal year 1984 is compared with fiscal year 1985 and the first six months of fiscal year 1986.

CONTINUED

IV. Conclusions: Comparison of the actual data and the projected data indicates that the changes recommended by the Air Force Logistics Management Center have produced the desired and projected results. The author did find that stockage policy changes were ineffectively controlled and a need exists for a coordinated implementation plan for future major changes to Air Force stockage policy.

V. Recommendations: Changes made to the stockage policy are working and should be retained. Future changes should be carefully planned and controlled.

CHAPTER ONE

INTRODUCTION

> The Air Force for 10 years has been scrapping millions of dollars of needed spare parts and then, in many cases, repurchasing them at higher prices from junk and salvage dealers... Since 1974, Air Force procedures have called for automatic disposal of many spare parts, ranging from screws and nuts to airplane doors, if none had been requested within the past 12 months... Time and time again, we came across instances that on maybe the 13th month, a requirement for that item came up, and we would go and the shelf was empty, and we would have to reprocure it.
>
> Washington Post, 7 July 1984

The above excerpts highlight the problem with the past Air Force spare parts retention policy. Lieutenant General Leo Marquez, Deputy Chief of Staff for Logistics and Engineering, HQ USAF, explains, assets. . . "that we acquired very efficiently at the front end could go out the back door in accordance with established retention policy." (1:18) General Marquez emphasized the importance of stockage policy to efficiently and effectively support the Air Force mission.

To emphasize the importance of supply and stockage policy, he declared fiscal year 1985 as the Year of Supply. The Air Force Logistics Management Center (AFLMC) was tasked to spearhead efforts to improve the supply system. After careful analysis, AFLMC made several recommendations to the Air Staff which the Air Force implemented in the beginning of FY85. (9)

This report explains four of the AFLMC recommended changes to the supply system and compares actual with forecasted results. The old and the new supply stockage policies will be explained as well as the method of measuring improvements in the Air Force supply system. Conditions and problems that influenced the 1984 changes or their evaluation will be explained. Finally, recommendations will be made to improve implementing future changes to the supply system.

PROBLEM STATEMENT

Are the 1984 changes to the Air Force spare parts stockage

policy producing the desired results and is the Air Force accurately tracking and controlling changes in supply performance?

The four stockage policy changes involve these areas:

(1) Cost variables which are used to compute the order quantity for consumable or economic order quantity (EOQ) items.

(2) Safety levels for EOQ items.

(3) Retention of EOQ items.

(4) Demand leveling for selected field-level reparable items.

BACKGROUND

The Air Force Logistics Management Center received the following taskings:

(1) Cost Variables for EOQ Items. Cost variables, [illegible] cost to place an order and holding cost, are used to compute order quantities, or how much to order, for EOQ items. In May 1978, the United States Air Force Director of Maintenance and Supply (USAF/LEY) tasked AFLMC to update these factors periodically so Air Force bases would order the most economical quantity for EOQ items based on the appropriate variable costs. The AFLMC recommended changes to the cost variables that would result in an increased order quantity, i.e., bases will order more items every time they place an order. (3:1-3)

(2) Safety Levels for EOQ Items. AFLMC initiated a study to analyze and develop alternative forecasting techniques for both demand averages and demand variation for EOQ items. The forecast for demand averages and variances is the biggest factor in determining the depth or how much to stock. AFLMC recommended changes to the way the Air Force forecast the variance or demand. The forecast of the variance of demand is used in determining the safety level. (4:1-2)

(3) Retention of EOQ Items. In 1984 the Air Force Stockage Advisory Board tasked the AFLMC to evaluate the Air Force base level retention policy. Bases were disposing of items that would be needed later at the same base. United States Air Force Deputy Chief of Staff for Logistics and Engineering (USAF/LE) approved AFLMC recommendations to increase the retention period for consumable items. (5:1)

(4) Demand Leveling for Field-level Reparable Items. In November 1983, the Wholesale-Retail Panel of the Standard Base Supply System MAJCOM Advisory Group requested that AFLMC conduct an analysis on stockage policy for field-level reparable assets. The Air Force was not repairing many field level reparable units, and the AFLMC found it was appropriate to use reparable item demand levels for items that were not being repaired. Their recommendation was to add an EOQ to the existing demand level for field-level reparable items that display characteristics of EOQ items. (6:1-3)

PREVIOUS STUDIES

The Air Force Logistics Management Center has published individual studies on each of the four supply system changes covered in this report. The studies were the basis for changing supply policy. This report uses information from the four separate AFLMC studies to identify the policy changes and forecasted results.

OBJECTIVES

The objectives of this study are to:

(1) Compare actual implementation costs and benefits of the policy changes with forecasted costs and benefits.

(2) Investigate the Air Force's ability to track the performance of supply system changes.

(3) Recommend improvements to the supply system stockage policy change process.

CHAPTER TWO

ANALYSIS

OVERVIEW

This chapter documents the analysis of the 1984 stockage policy changes. The Air Force changed four areas of the spare parts stockage policy based on recommendations from the Air Force Logistics Management Center. This chapter will identify the four supply policy areas, including the background, old policy, new policy, projected costs, and projected benefits for each area. The next section describes the analysis methodology and the third section documents the actual performance resulting from the changes. The final section identifies several issues with the management and control of the change process.

SUPPLY POLICY

Economic Order Quantity Cost Variables

Background. An Economic Order Quantity (EOQ) item is a consumable item which usually cannot be economically repaired. This term includes all types of consumable items, such as minor parts, components, tools, administrative supplies, and hardware. For EOQ items, accountability is terminated upon issue. Demand levels for EOQ items are based on total variable inventory cost, which includes the cost of the item, the cost to order, and the cost to hold the item. The quantity to order that minimizes total variable cost is called the Economic Order Quantity. The cost to hold an item is expressed as a percentage of the item cost, while the cost to order an item is expressed as a flat cost per each order. (2:11-3)

Old Policy. The old policy used average values for cost to order and cost to hold based on 1980 measurements. (3:25)

New Policy. Using 1983 data the AFLMC recalculated the values to order and hold an item and found the previous costs had changed. The cost to place an order had increased from $4.74 to $5.20 and the cost to hold an item had decreased from 25% to 15% of the cost of the item. The cost to order local purchase items also increased from $15.84 to $19.94. AFLMC recommended that the new values be used. (3:25)

Projected Costs and Benefits. By using the new values to find the EOQ, stock levels would increase, resulting in a projected 1% increase in stockage effectiveness. Stockage effectiveness measures the line item fill rate for stocked (demand leveled) items. The projected cost was $31 million for General Support Division (GSD) and $11 million for System Support Division (SSD). The AFLMC projected a 3% decrease in the number of incidents resulting in the grounding of major end items such as aircraft, engines, vehicles, etc. (10)

Economic Order Quantity Safety Levels

Background. The Safety Level Quantity is the number of assets required to be on hand to permit continuous operation in the event of uncertain demand or lead times. The Order and Ship Time Quantity is the quantity required to be on hand to meet demands during the period it takes to place an order and have it transported. These quantities are summed to determine the reorder point or when to reorder. (2:11-4)

Old Policy. The old policy underestimated the uncertainty or variance of demand 40% of the time and did not consider variations in order and ship time at all. Demand for many items is more variable than was estimated with the previous policy. Variations in order and ship time were not considered, but certainly could impact supply support. Manufacturing time or shipping time are susceptible to labor strikes, bad weather conditions, etc. (4:15) More inventory is needed as a buffer to ensure uninterrupted mission performance.

New Policy. The AFLMC recommendation was to change the safety level formula to accurately measure the variance of demand and to consider the variance in order and ship time. (4:15-16)

Projected Costs and Benefits. By using the new formula, stockage effectiveness was projected to increase 4.7% at a cost of $76 million for GSD and $25 million for SSD. (4:15) This represents new requirements and is an increase in inventory. The AFLMC projected a 4% decrease for mission capability (MICAP) incidents. (4:16)

Economic Order Quantity Retention

Background. Items for which there is no longer any need should be considered excess. When items are declared excess, they are disposed of. If they are declared excess too soon, the Air Force must repurchase the item. If they are held too long, the Air Force incurs needless holding costs. (10)

Old Policy. The Air Force specified 365 days as the retention time for all EOQ items. The AFLMC found that many

items had an average time between demands greater than 365 days and that many items identified as excess were later critically needed for mission support. For these reasons, AFLMC suggested that retention time for all items be increased based on past demand and the Mission Impact Code, a code that identifies the essentiality of the item to Air Force weapon systems. (10)

New Policy. The AFLMC recommended new retention times from 2.5 years for the least urgent items to 3.25 years for items with the highest mission impact code. This new retention period would compensate for infrequent demands for certain items. For example, the item that is requested every 13 months on average would not be declared "excess" after 12 months only to be required the next month. (5:18)

Projected Costs and Benefits. This increase in retention was projected to reduce MICAP incidents by 2% and increase on-hand inventory by $116 million total for GSD and SSD. The increase in inventory is from retention of existing assets and does not represent additional cost. (5:16)

Adding an EOQ to Selected Field-level Reparable Items

Background. Field-level reparable items are items that are supposed to be fixed at the base level rather than the depot. If the item is found to be beyond economic repair at the base, it is discarded. (6:1)

Old Policy. Field-level reparable items are stocked differently than EOQ items, but many of these items perform similar to EOQ items. The AFLMC found that about 75% of all field-level reparable items cost less than $750 and better than 60% of the items were being replaced rather than repaired at base level. Reparable item demand levels assume repair at the base. Since many items are not being repaired, demand levels were insufficient to effectively support the mission. (6:2)

New Policy. The AFLMC recommended adding an EOQ to selected field-level reparable items and using the previous demand level as the reorder point. Thus, less expensive items (less than $750) that were not being repaired are now stocked similar to EOQ items. (6:3)

Projected Costs and Benefits. In light of this change, the AFLMC projected that fill rates for field-level reparable items would increase 14.5% at a cost of $3 million for General Support Division (GSD) and $4 million for System Support Division (SSD) items. The AFLMC projected a 6.9% decrease in MICAP incidents caused by field-level reparable assets. (6:2-3)

Summary

The Air Force changed four areas in supply policy based upon the recommendations from the Air Force Logistics Management Center. Figure 2.1 is a combined list of cost and benefit projections from all four stockage policy areas.

	Cost ($ Millions)		Benefit			
			Stockage Effectiveness		MICAP	
	GSD	SSD	EOQ	Reparable	EOQ	Reparable
EOQ Cost Variables	31	11	1%		3%	
EOQ Safety Level	76	25	4.7%		4%	
EOQ Retention					2%	
Demand Leveling	3	4		14.5%		6.9%
Total	110	40	5.7%	14.5%	9%	6.9%

Figure 2.1 AFLMC Projection Summary

In Figure 2.1, the term "stockage effectiveness" means the fill rate for items that should be on-hand. Later in this report, the projected data will be compared to the actual costs and benefits of the changes made to the stockage policy.

METHOD OF ANALYSIS

To evaluate the actual performance resulting from implementing these stockage policies, information was needed on the actual cost and benefits of the policy changes. Data from the Worldwide Supply Performance Report (M-32) and the Consolidated Stock Fund Data Report (M-20) were tracked on a monthly basis to get the average annual performance.

The M-32 Monthly Base Supply Management Report provides standard management products for Standard Base Supply System (SBSS) managers. It is used to provide data for analysis of SBSS overall operational effectiveness, potential problem area identification, and statistical data in support of system modifications. For this report, the Worldwide Supply Performance

Reports were used to track actual benefits produced by the policy changes. (2:24)

The M-20 Stock Fund Stratification Program provides uniform stratification for both General Support (GSD) and System Support Divisions (SSD) of the Air Force Stock Fund. It identifies assets and provides aggregate measures of a base's logistics requirements by measuring asset availability against known requirements. It provides the capability to report stock fund assets and transactions as a basis to prepare stock fund operating programs. For this report, both the GSD and SSD Consolidated Stock Fund Data Reports are used to track actual costs of the 1984 stockage policy changes. (2:24)

The AFLMC projected the costs and the benefits of the changes as measured by an increase in stockage effectiveness and a decrease in MICAP incidents. The next section examines the actual data collected. Other problems that have a bearing on this problem are also discussed.

ACTUAL PERFORMANCE

Having identified the changes to the supply system along with the projected costs and benefits, actual performance was compared with the projections. Since the four changes were implemented at about the same time, the projected results were combined and discussed in terms of costs, fill rates, and mission capability (MICAP) incidents. As a reminder, a MICAP incident is a request for an item that cannot be filled and results in the grounding of a major end item, such as aircraft, engines, vehicles, etc. A reduction in the number of MICAP incidents is good for the Air Force and a sign of better supply management. (9) Data from fiscal year 1984 were compared with data from FY85 and FY86. The changes were implemented in June 1984 (EOQ Cost Variables) and October through November 1984 (Safety Level, EOQ Excess and Adding an EOQ to Field Reparable Items).

Cost of Policy Changes The combined General Support Division (GSD) cost of all four changes was projected by the Air Force Logistic Management Center to be $110 million. Data from the monthly GSD Consolidated Stratification and Transaction Report (M-20) were compiled and shown in Figure 2.2. Four categories, operating level, order and ship time, safety level, and repair cycle; comprise the total demand level and were combined to arrive at the total GSD cost. Figure 2.2 shows an increased requirements level of $134.3 million which is compared to the projected $110 million. See Appendices A and B for examples of the Consolidated Stratification and Transaction Report.

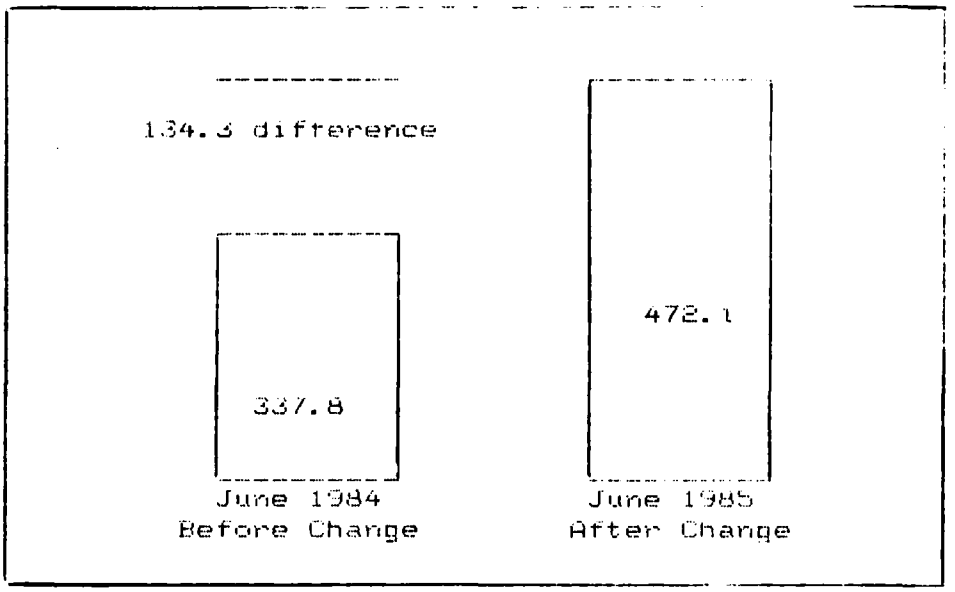

Figure 2.2 Increases in General Support Division Requirements Level

Figure 2.2 shows a $134.3 million increase in GSD requirement levels as compared to the projected $110 million. The AFLMC $110 million projection was for inventory augmentation which is the amount of inventory that has to be procured to satisfy the new level. Although the requirement increased by $134.3 million, not all of that had to be procured. There was existing inventory to satisfy some of the requirement. When the new stockage policies were implemented, there was no snapshot of the inventory requirements or on hand balances directly after implementation. This was because of programming errors in the MEO. The best estimate of the change was therefore made by comparing June 1985 data with June 1984 data. This does not allow an accurate measure of the inventory augmentation cost. Some of the on-hand inventory would have been applied against the new requirement level and therefore would not have had to be procured. It is safe to say that the GSD cost was less than $134.3 million.

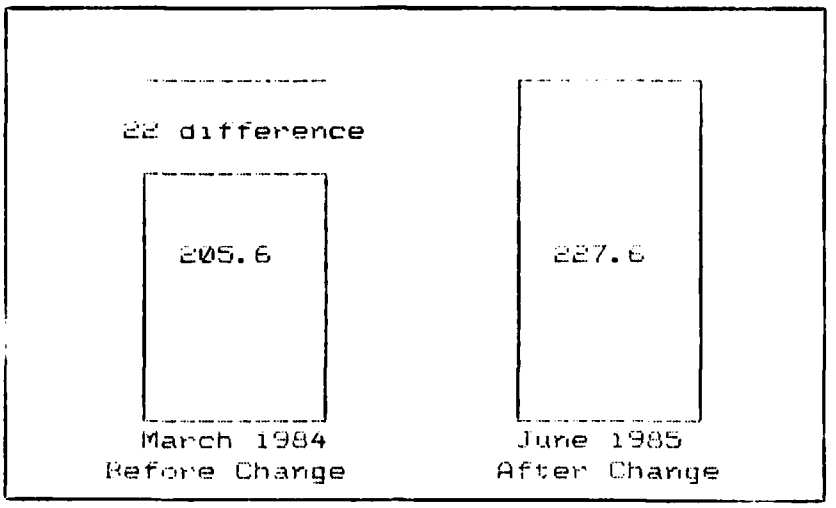

Figure 2.3 Increases in System Support Division

Figure 2.3 shows a $22.0 million increase in SSD requirements as compared to the projected $42.4 million due to the 1984 stockage policy changes.

In summary, the AFLMC projected an inventory augmentation requirement of $150 million (110 + 40). The actual increase in the total requirements level was $156.3 million (134.3 + 22). The actual inventory augmentation cost cannot be accurately computed, because there was no snapshot immediately after implementation. However, the inventory augmentation cost was less than $156 million. Regardless, the AFLMC cost projections were remarkably accurate. The actual requirements levels were within 5% of the AFLMC projections.

Stockage Effectiveness The Air Force Logistics Management Center projected stockage effectiveness to increase 4.7% for LOW items and 14.5% for field reparable items as a result of the four supply policy changes. Data on stockage effectiveness was taken from the USAF Supply Management Report (M-3P) each month and combined in Figure 2.4. See Appendices C and D for examples of the USAF Supply Management Report.

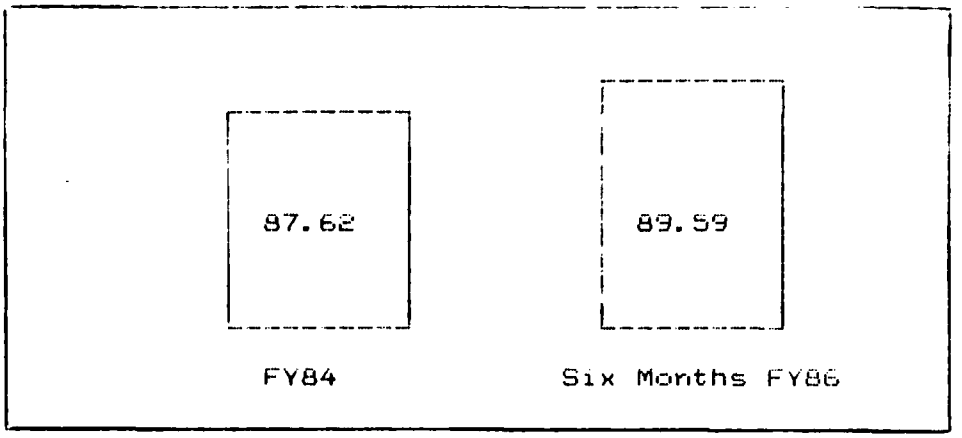

Figure 2.4 EOQ Stockage Effectiveness in Percent

Figure 2.4 shows a 2.3% ((89.59 - 87.62) / 87.62) increase in average stockage effectiveness compared to the projected 4.7% increase.

The increase in stockage effectiveness for field reparable items could not be measured, because fill rates for field reparable items are not measured separately in the M-32. As shown in Figure 2.4, there has been a significant increase in the EOQ stockage effectiveness, but not up to the AFLMC's projection. There are two mitigating factors. First and foremost, the program implementing the new safety level did not work. The AFLMC identified the programming error in August 1985 and it was corrected in late November 1985. The correction should further increase stockage effectiveness. Secondly, stockage effectiveness is not the best way to measure the impact of the stockage policy changes. Net unit fill rate is a better measure, but the M-32 does not accurately measure unit fill rates. Stockage effectiveness is computed for all stocked items by:

$$\frac{\text{Line Items Filled}}{\text{Line Items Filled + Line Items Back ordered}}$$

An example shows why stockage effectiveness is not the best fill rate performance measure. Assume a customer requests ten units of an item and only 2 are available. The Air Force stockage effectiveness for this transaction is 50%, two units were issued (one line item filled) and eight units back ordered (one line item back ordered). On the other hand, the unit fill rate for this transaction is 20%. Now assume the new stockage policy increased on-hand stock to eight units. Stockage effectiveness would again be 50%, but unit effectiveness is 80% -- a significant increase. Stockage effectiveness does not accurately measure the increased performance. (10)

MICAP Incidents The Air Force Logistics Management Center projected MICAP incidents to decrease by 9%. Data from the monthly USAF Supply Management Reports were compiled in Figure 2.5 to show Economic Order Quantity (EOQ) MICAP performance. See Appendices E and F for examples of where MICAP data is displayed in the USAF Supply Management Report.

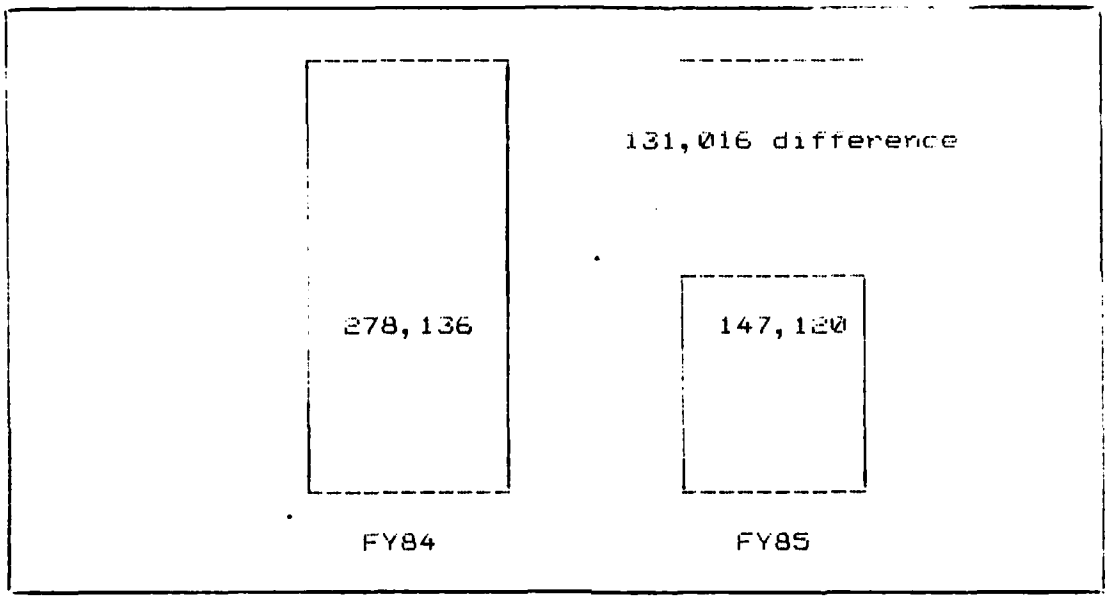

Figure 2.5 Total Economic Order Quantity MICAP Performance

Figure 2.5 shows a decrease of 131,016 EOQ MICAP incidents or a 47% decrease as compared to the projected 9% decrease.

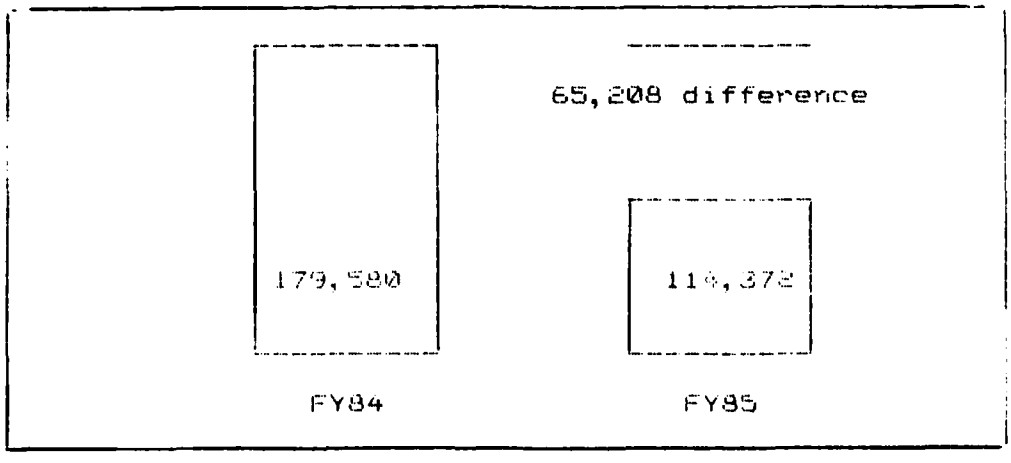

Figure 2.6 Total Field Reparable MICAP Performance

Figure 2.6 shows a decrease of 65,208 field reparable MICAP incidents or a 36% decrease as compared to the projected 5.9% decrease. However, not all reductions in field reparable MICAP occurrences were a result of adding an EOQ to selected field reparable items. Figure 2.7 shows the decrease in MICAP occurrences for stocked items.

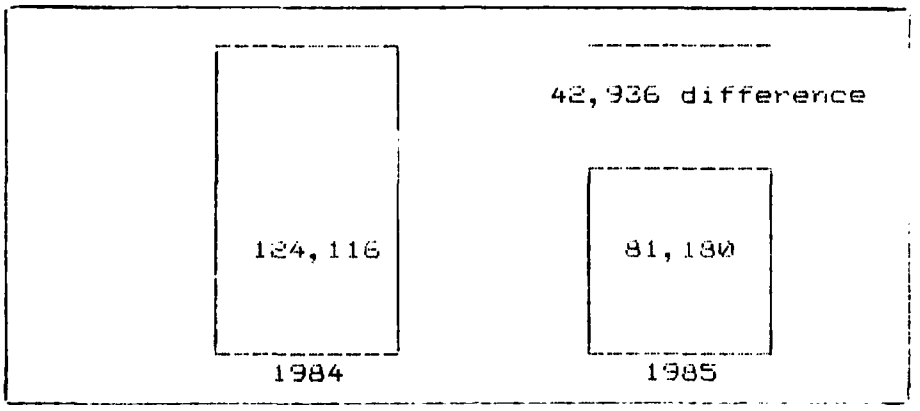

Figure 2.7 MICAP Occurrences For Stocked Items

A reduction of 42,936 MICAP occurrences was affected by the EOQ for field reparable policy. The remaining MICAP reductions (22,272) for non-stocked items were a result of the moratorium on disposal of assets. These benefits will continue after the moratorium is lifted, because of the implementation of the recommendations from the AFLMC's XF 3 Retention Study. In that study, the AFLMC projected a decrease of 2% in MICAP occurrences as compared to the 12.4% that actually occurred. (11)

Economic Order Quantity Retention In 1984, the Air Force put a freeze on discarding unused spare parts until implementation of new retention policy. The Air Force Logistics Management Center recommended a new policy to retain spare parts longer and projected an increase in on-hand inventory of $116 million. Thus, the moratorium caused the items to be held before the policy was implemented. Regardless, the performance projections should still hold. The stock fund totals, as tracked in the M-4W Stock Fund Stratification Program, reflect the dollar value of the stock on-hand. The stock fund is measured in two divisions. General Support Division (GSD) and System Support Division (SSD). Figures 2.8 and 2.9 indicate the actual total increases in the stock fund totals for both GSD and SSD. (11)

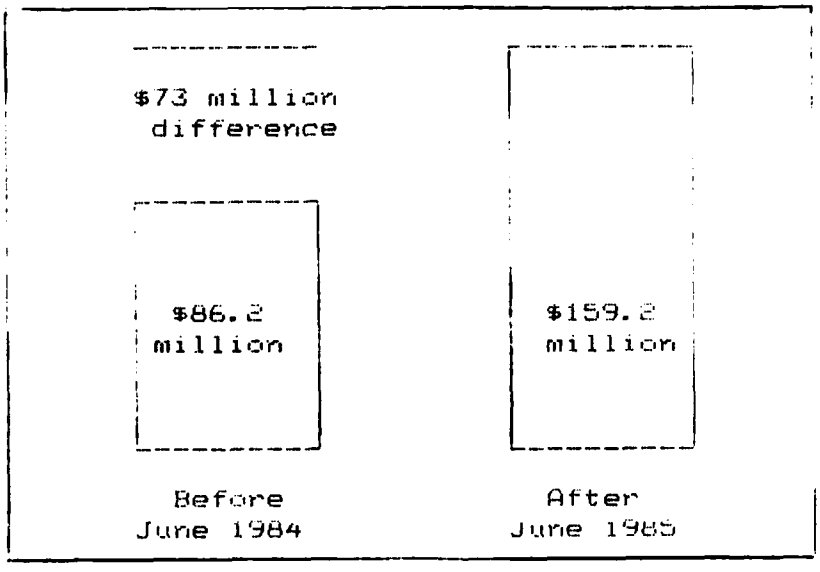

Figure 2.8 GSD Stock Fund Totals

Figure 2.8 shows a $73 million increase in the GSD Stock Fund.

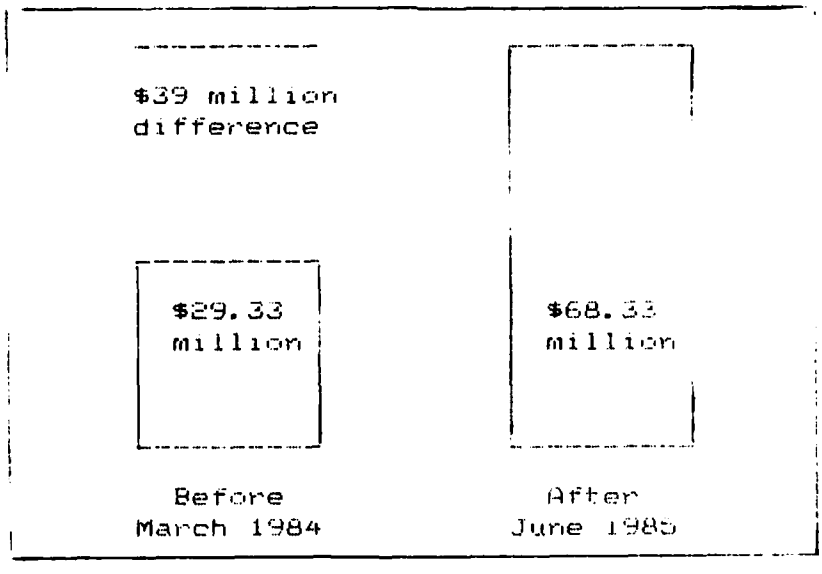

Figure 2.9 SSD Stock Fund Totals

Figure 2.9 shows a $39 million increase in the SSD stock fund. The stock fund total from Figure 2.8 and Figure 2.9 is $112 million as compared to the AFLMC projected $116 million.

ISSUES

During the process of identifying and evaluating the changes made to the spare parts stockage policy, several issues were identified.

1. Conversion to the new Phase IV computer system delayed releveling at some bases. This caused a vague starting point to collect data after the stockage policy changes. The stockage policy program changes were implemented, but required releveling prior to the new levels taking effect. Some bases sent their M-20 report before releveling so the new stockage policy was not accurately measured immediately after implementation. Thus, the inventory augmentation cost could not be accurately measured. (9)

2. The cost of the stockage policy could also not be accurately measured because of problems with the M-20.

3. Instructions to the field on how to run M-20 data were misinterpreted or not followed. Air Force stock fund managers did not know or did not understand the stockage policy changes and their expected impacts. This prevented a clear snapshot of data before or after the policy changes were made. As a result, the Air Force did not take the necessary actions to compute the inventory augmentation costs. (9)

4. Inaccurate and invalid measurements on the M-32 resulted in erroneous unit fill rates. Unit fill rates varied significantly from month to month and in some months exceeded 100%. Therefore, unit fill rates, which is a more accurate measure of fill rates than stockage effectiveness, could not be measured.

5. The program released by the Data Systems Design Office (DSDO) contained the wrong safety level computation. The DSDO corrected the safety level in November 1985. However, for this report, the AFLMC could not accurately measure the complete impact of the safety level change. It is reasonable to expect fill rates to increase further. (9)

6. The moratorium on disposal of assets compounded the measurement of the stock fund impact resulting from the new D20 retention criteria.

7. The Supply Management Report does not accurately measure unit fill rates and does not measure fill rates by commodity group. Since different commodity groups have a different stockage policy, lack of performance data hinders management. As a result, base level reparable fill rates could not be measured.

CHAPTER THREE

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The four changes recommended by the Air Force Logistics Management Center significantly improved the supply system's capability to support the Air Force mission.

2. Some of the AFLMC's measurable projections were accomplished at least to some degree. Considering the compounding issues, the projections were remarkably accurate.

3. The AFLMC's models and stockage policy forecasting techniques are valid.

4. The stockage policy changes were ineffectively controlled; there is a need for coordinated implementation plans.

5. Data collected before and after the stockage policy changes indicate a lack of knowledge on the part of Air Force stock fund managers.

6. The Air Force Supply Management Report needs to be improved to provide accurate and valid performance measures for all commodity groups.

RECOMMENDATIONS

1. Retain the new stockage policies. (OPR: HQ USAF/LEY)

2. Appoint a change agent or committee to oversee all future major stockage policy changes. (OPR:HQ USAF/LEYS)

3. The change agent (committee) should develop an implementation plan to include:

   a. Actions required by HQ AFLC, wholesale agencies, MAJCOMs, bases, and DSDO.

   b. How and when the performance is to be measured.

   c. How to ensure adequate quality control on the changes.

d. Who and when to document the performance. (OPR: HQ USAF/LEYS appointed change agent)

4. Review and improve the Supply Management Report (M-63) stockage policy indicators to ensure accuracy and completeness. (OPR: DSDO/LGS)

5. Continue to use the AFLMC models and forecasting techniques to forecast future stockage policy impacts. (OPR: AFLMC/LGS)

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3. US Air Force Logistics Management Center. Modification of the Standard Base Supply System Stock Leveling Techniques. Technical Report No. 161138-1. Gunter AFS, AL: April 1983.

4. US Air Force Logistics Management Center. Demand Forecasting. Technical Report No. LS791003-3. Gunter AFS, AL: May 1984.

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6. US Air Force Logistics Management Center. XE3 Analysis. Technical Report No. LS791002-1. Gunter AFS, AL: February 1984.

7. US Air Force Consolidated Stock Fund Data Report (M-20), monthly reports from 1983 - present.

8. US Air Force Worldwide Supply Performance Report (M-32), monthly reports from 1983 - present.

Other Sources

9. September, 1985 interview with Major Douglas Blazer, Air Force Logistics Management Center, Gunter AFS, Alabama.

10. October, 1985 interview with Captain Martha Ham, Air Force Logistics Management Center, Gunter AFS, Alabama.

11. December, 1985 interview with Major Douglas Blazer, Air Force Logistics Management Center, Gunter AFS, Alabama.

APPENDICES

CONSOLIDATED STRATIFICATION

TOTAL AIR FORCE — TABLE III REPORT

30 JUN 84

	REQUIREMENT COL 1	SERVICEABLE STOCK ON HAND COL 2	UNSERVICEABLE STOCK ON HAND COL 3	ON ORDER DUE IN COL 4	ON ORDER DIFM COL 5	DEFICIT COL 6
A READINESS POSITION						
1 ASSETS, STRATIFICATION DATE		603,443,404	526,298,705	488,452,717	19,358,873	
2 ASSETS, ANTICIPATED NON-RECOVERABLE			522,779,177		17,877,883	
3 PREPOSITIONED W/R PROTECTABLE	142,842,849	108,728,853	10,588	4,808,747	2,290	30,838,883
4 REQUISITIONING OBJECTIVE	748,819,308	220,407,949	2,394,143	394,180,050	857,010	131,837,164
A STOCK DUE OUT	380,872,984	7,847,950	249,724	322,897,453	30,787	49,777,837
B SAFETY LEVEL	74,002,907	54,489,018	27,142	14,846,010	2,957	4,640,739
C NUMERICAL STOCKAGE OBJECTIVE	118,403,491	81,328,118	1,892,466	19,026,334	171,888	16,355,573
D REPAIR CYCLE	18,383,230	11,578,993	411,869	4,448,580	351,378	1,943,988
E OPERATING LEVEL	157,156,714	65,062,872	13,142	32,961,673		59,119,027
5 BALANCE PREPOSITION WAR RESERVE	1,080,901,281	2,421,780	44,777	874,095	18,272	1,077,080,898
B OPENING/RETENTION POSITION						
1 ASSETS, STRATIFICATION DATE		603,443,404	526,298,705	488,452,717	19,358,873	
2 ASSETS, ANTICIPATED NON-RECOVERABLE			522,779,177		17,877,883	
3 PREPOSITIONED W/R PROTECTABLE	142,842,849	108,728,853	10,588	4,808,747	2,290	30,838,883
4 REQUISITIONING OBJECTIVE	837,048,417	268,105,765	2,433,408	422,373,987	863,309	144,135,287
A STOCK DUE OUT	380,872,984	7,847,950	249,724	322,897,453	30,787	49,777,837
B SAFETY LEVEL	74,002,907	54,489,018	27,142	14,846,010	2,957	4,640,739
C NUMERICAL STOCKAGE OBJECTIVE	118,403,491	81,328,118	1,892,466	19,026,334	171,888	16,355,573
D REPAIR CYCLE	18,383,230	11,578,993	411,869	4,448,580	351,378	1,943,988
E ORDER AND SHIP TIME	88,229,111	47,897,808	39,265	28,193,917	8,298	12,298,123
F OPERATING LEVEL	157,156,714	65,062,872	13,142	32,961,673		59,119,027
TOTAL A,B,C,D,E,F		338,770,962				
6 AFAO - DEMAND REQUIREMENTS	4,345,040,292	82,471,898	881,703	33,263,742	251,292	4,248,722,909
A CURRENT YEAR FY 1984	355,868,848	23,322,407	103,895	12,198,927	80,564	320,045,720
B APPORTIONMENT YEAR FY 1985	1,454,435,021	28,857,400	302,087	17,720,328	108,882	1,408,755,195
C BUDGET YEAR FY 1986	1,454,435,021	7,070,301	130,934	2,372,391	45,794	1,444,861,395
D BALANCE AFAO	1,080,901,281	2,421,780	44,777	874,095	18,272	1,077,080,898
8 BALANCE PREPOSITION WAR RESERVE						
7 ECONOMIC RETENTION	1,984,149,154	38,812,775	318,895	2,815,491	195,008	
A LIFE CYCLE RETENTION	10,778,942	10,555,077	201,731	23,135	171,869	
B USAF DIRECTED RETENTION	12,035,682	12,032,021	831	2,707		
8 LOCAL EXCESS		86,226,383	524,958,133	33,032,770	18,348,773	
A USAF POLICY RETENTION		4,123,504	13,510	19,672	844	
B MAJCOM DIRECTED RETENTION		2,380,833	6,828	184	2,139	
C LOCAL DIR RET/SPEC RQMT DUE-IN		11,249,981	30,510	4,809,234	34,811	
D PENDING DSP/CANC REQUESTED		22,373,288	192,765,781	8,057,409		
E REPORTED AWAITING ICP REPLY		18,833,367	1,180,070	7,271		
F PENDING REPORT/CANC TO ICP		27,265,332	313,124,733	20,279,000		

PCN F314004

PREPARED 09/04/85 CONSOLIDATED STRATIFICATION AND TRANSACTION REPORT AS OF 30 JUN 85 PCN F314004
GENERAL SUPPORT - TOTAL AIR FORCE TABLE III REPORT PART I LOG-LOR(Q)7197

	REQUIREMENT COL 1	SERVICEABLE STOCK ON HAND COL 2	UNSERVICEABLE STOCK ON HAND COL 3	ON ORDER DUE IN COL 4	ON ORDER DIFM COL 5	DEFICIT COL 6
A READINESS POSITION						
1 ASSETS, STRATIFICATION DATE	616,665	731,357,393	38,744,873	654,221,540	14,802,103	
2 ASSETS, ANTICIPATED NON-RECOVERABLE			32,630,322		13,035,324	
3 PREPOSITIONED W/R PROTECTABLE	204,586,033	130,782,193	13,039	9,901,228	8,662	63,889,573
4 REQUISITIONING OBJECTIVE	995,408,609	286,971,255	2,156,393	534,159,512	670,554	172,121,449
A STOCK DUE OUT	497,651,102	8,226,286	267,723	430,491,333	127,839	58,665,760
B SAFETY LEVEL	97,205,454	66,853,561	151,851	22,642,492	65,232	7,557,550
C NUMERICAL STOCKAGE OBJECTIVE	125,470,388	84,738,899	1,391,134	22,243,538	176,230	17,096,817
D REPAIR CYCLE	1,526,261	1,003,618	104,083	230,244	98,074	188,316
E OPERATING LEVEL	273,555,404	126,148,891	241,602	58,551,905	203,179	88,613,006
5 BALANCE PREPOSITION WAR RESERVE	1,045,796,355	2,780,739	53,248	1,054,542	25,485	1,041,907,826
B OPENING/RETENTION POSITION						
1 ASSETS, STRATIFICATION DATE	616,665	731,357,393	38,744,873	654,221,540	14,802,103	
2 ASSETS, ANTICIPATED NON-RECOVERABLE			32,630,322		13,035,324	
3 PREPOSITIONED W/R PROTECTABLE	204,586,033	130,782,193	13,039	9,901,228	8,662	63,889,573
4 REQUISITIONING OBJECTIVE	1,095,180,315	341,347,213	2,233,152	585,527,634	713,846	186,072,316
A STOCK DUE OUT	497,651,102	8,226,286	267,723	430,491,333	127,839	58,665,760
B SAFETY LEVEL	97,205,454	66,853,561	151,851	22,642,492	65,232	7,557,550
C NUMERICAL STOCKAGE OBJECTIVE	125,470,388	84,738,899	1,391,134	22,243,538	176,230	17,096,817
D REPAIR CYCLE	1,526,261	1,003,618	104,083	230,244	98,074	188,316
E ORDER AND SHIP TIME	99,771,706	54,375,958	76,759	31,368,122	43,292	13,950,867
F OPERATING LEVEL	273,555,404	126,148,891	241,602	58,551,905	203,179	88,613,006
TOTAL B,D,E+F	411,053,325					
5 AFAO - DEMAND REQUIREMENTS	4,149,414,072	58,051,639	681,213	38,242,809	335,420	4,052,438,411
A CURRENT YEAR FY 1985	336,886,991	22,703,878	106,908	13,179,727	101,659	300,896,480
B APPORTIONMENT YEAR FY 1986	1,383,365,363	25,157,714	389,469	19,973,960	154,448	1,337,844,220
C BUDGET YEAR FY 1987	1,383,365,383	7,409,310	131,588	4,034,580	53,828	1,371,789,885
D BALANCE AFAO	1,045,796,355	2,780,739	53,248	1,054,542	25,485	1,041,907,826
6 BALANCE PREPOSITION WAR RESERVE						
7 ECONOMIC RETENTION	2,152,383,358	42,014,984	314,158	4,865,622	169,992	
A LIFE CYCLE RETENTION	10,285,586	10,038,070	167,141	80,368	127,253	
B USAF DIRECTED RETENTION	12,329,880	12,302,986	14,222	12,850	14,222	
8 LOCAL EXCESS		159,181,364	35,503,311	35,684,247	13,574,183	
A USAF POLICY RETENTION		7,582,565	19,723	16,098	789	
B MAJCOM DIRECTED RETENTION		4,004,263	8,482	237	2,596	
C LOCAL DIR RET/SPEC RQMT DUE-IN		17,696,190	29,728	10,018,288	29,728	
D PENDING DSP/CANC REQUESTED		44,678,510	4,112,201	11,708,704		
E REPORTED AWAITING ICP REPLY		19,323,422	608,811	12,605		
F PENDING REPORT/CANC TO ICP		65,859,230	17,242,439	13,928,027		

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Appendix B
21

CUSTOMER SUPPORT EFFECTIVENESS

OVERALL SUMMARY

URGENCY OF NEED	LINE ITEMS REQUESTED	LINE ITEMS ISSUED	LINE ITEMS BACK ORDERED	ISSUE EFFECTIVENESS	LINE ITEMS B/O 4W	STOCKAGE EFFECTIVENESS	DOR ON TIME	TOTAL DOR	RELEASE EFFECTIVENESS
GENERAL SUPPORT DIVISION									
A	76252	51241	32492	61.27%	24821	86.96%	12673	31195	40.62%
B	56358	26421	35940	42.36%	29127	79.45%	14657	33439	43.43%
C	[illegible]	[illegible]	61816	79.36%	39289	91.36%	35325	57229	61.69%
TOTAL	413522	314057	132736	72.75%	93117	89.49%	62635	121863	51.39%
SYSTEM SUPPORT DIVISION									
A	36722	22651	14967	61.24%	7937	77.68%	5381	13217	48.71%
B	15717	7113	11673	38.01%	8067	66.80%	4484	8259	54.29%
C	34898	27713	7471	80.43%	3065	87.46%	4216	5651	72.25%
TOTAL	27329	61484	34141	64.36%	19073	80.42%	14281	27327	51.52%
CENTRAL LEVEL ANALYSIS									
A	41156	32366	7966	80.69%	81	80.26%	3237	7387	43.82%
B	3546	2439	1796	57.59%	52	58.32%	455	1126	40.47%
C	4557	4401	156	95.95%	2	95.95%	38	64	59.37%
TOTAL	49343	39196	9553	79.63%	133	79.85%	3730	8577	43.48%
NON-CENTRAL LEVEL ANAL									
A	13534	7921	6442	55.14%	3272	71.43%	2382	5757	41.37%
B	2936	1381	1562	46.92%	954	69.43%	422	997	42.12%
C	4113	3871	243	97.18%	116	98.48%	115	242	47.91%
TOTAL	25174	17573	8252	68.41%	4342	82.04%	2917	6994	41.70%
OVERALL TOTAL									
A	167966	114586	61859	65.88%	36089	81.67%	23673	57556	41.13%
B	74250	37355	52971	42.32%	38182	74.59%	24216	43821	45.67%
C	329191	24[illegible]	69521	82.14%	42394	91.18%	39674	63384	62.59%
TOTAL	575407	432929	182281	70.37%	116663	86.83%	83363	164761	50.59%
ERRC SUMMARY									
RECOV	95893	72312	23581	74.11%	7587	80.34%	9569	21731	43.99%
AWS	479415	360419	156551	59.36%	109476	58.27%	73803	143632	51.59%
TOTAL	575408	432929	182281	72.37%	116663	86.83%	83363	164761	52.59%
EQUIP	12471	1330	11141	14.44%	4735	22.57%	1697	10599	12.21%

3 JAN 86 GUNTER AFS NOV 85 USAF SUPPLY MANAGEMENT REPORT(316-6511081) 1968 DATE 6003 PAGE 5

CUSTOMER SUPPORT EFFECTIVENESS

OVERALL SUMMARY

URGENCY OF NEED	LINE ITEMS REQUESTED	LINE ITEMS ISSUED	LINE ITEMS BACK ORDERED	ISSUE EFFECTIVENESS	LINE ITEMS B/O 4W	STOCKAGE EFFECTIVENESS	DOR ON TIME	TOTAL DOR	RELEASE EFFECTIVENESS
GENERAL SUPPORT DIVISION									
A	57448	39958	26983	59.69%	21060	97.09%	14023	29633	47.32%
B	34053	23359	25467	44.04%	21338	81.62%	13538	26395	51.29%
C	245146	204812	59837	77.62%	42148	92.38%	36617	60718	60.30%
TOTAL	340647	265129	111683	72.32%	84546	90.65%	64178	116746	54.97%
SYSTEM SUPPORT DIVISION									
A	26374	18363	9980	64.78%	5734	81.21%	4971	9097	54.64%
B	9685	5384	7769	40.91%	5416	69.57%	3531	6128	57.62%
C	24984	21960	5371	80.35%	2566	88.67%	3455	5242	65.90%
TOTAL	61043	45709	23120	66.49%	13716	82.93%	11957	20467	58.42%
CENTRAL LEVEL ANALYSIS									
A	32397	25982	9216	80.69%	170	81.12%	3394	5995	56.61%
B	3831	2164	1658	56.61%	58	57.49%	544	1243	43.76%
C	3524	3435	127	96.43%	1	96.46%	38	98	38.77%
TOTAL	38922	31581	8631	79.78%	229	80.25%	3976	7336	54.19%
NON-CENTRAL LEVEL ANAL									
A	11314	6729	4826	58.23%	2970	78.38%	2414	4372	55.21%
B	2263	1139	1569	42.06%	990	66.29%	462	1031	44.81%
C	1670	1483	201	88.06%	117	94.63%	64	147	43.53%
TOTAL	15247	9351	6596	58.63%	4077	78.77%	2940	5550	52.97%
OVERALL TOTAL									
A	127533	91032	48285	65.47%	29934	83.43%	24802	49397	50.51%
B	52832	29042	36863	44.06%	27802	76.21%	18075	34797	51.94%
C	275324	231696	64729	78.16%	44832	92.09%	40174	66235	60.68%
TOTAL	455659	351770	149597	72.16%	102568	88.20%	83051	150299	55.33%
ERRC SUMMARY									
RECOV	69173	52623	19277	73.26%	6611	80.66%	9355	17153	54.53%
EOQ	386486	298942	136328	69.64%	95957	89.69%	73696	132946	55.43%
TOTAL	455659	351770	149597	72.16%	102568	88.20%	83051	150099	55.33%
EQUIP	15038	2816	13973	16.84%	5565	25.21%	1356	15604	8.69%

MICAP ANALYSIS

CAUSE	NON-MA ITEMS NBR	PCT	EOQ ITEMS NBR	PCT	ECMT ITEMS NBR	PCT	TOTAL NBR	PCT
A-NO STK LVL-NO DEMANDS	2296	18	8478	50	8	72	12782	36
B-NO STK LVL-W/DEMANDS	1219	8	2298	13	2	7	3317	11
C-IM/SP PROHIBITS LVL	17	0	4	0	0	0	21	0
D-BASE DECISION-NO LVL	5	0	62	0	1	9	68	0
F-FULL STK-D BALANCE	86	0	88	0	0	0	174	0
G-FULL STK-ASSETS AWP	382	3	13	0	0	0	395	1
H-< FULL STK-RQN > STD	6801	53	3427	20	2	0	10230	34
J-< FULL STK-RQN < STD	859	6	1691	10	0	0	2541	8
K-< FULL STK-NO DUE-IN	231	1	595	3	0	0	826	2
P-COMPANY UNIQUE	328	2	0	0	0	0	328	1
R-FULL STK-INACCESSIBLE	586	4	5	0	0	0	591	2
Z-INITIAL SHORTAGE	34	0	6	0	2	18	42	0
TOTAL	12635		16647		11		29293	
DELETE								
0-CANCELLATION	599	2	968	2	2	7	1569	0
1-REC ALC/OTH SVCS	7661	28	3825	6	1	0	11487	2
2-REC DSA	2486	1	6325	13	19	0	8810	3
3-REC JLS	2224	7	2515	5	2	0	4539	0
4-CANN-PRECLUDE	2933	10	721	1	4	0	3658	0
5-REC LP	32	0	29226	61	1326592	99	1355850	99
6-REC BASE ASSETS	780	2	891	1	0	0	1671	0
7-WRM ASSET USED	12223	44	2176	4	0	0	14129	0
8-CANN-SATISFY	195	0	217	0	0	0	412	0
9-RPT ERROR	471	1	806	1	0	0	1277	0
TOTAL	26994		47562		1326618		1401172	

MICAP ANALYSIS

CAUSE	NON-MA ITEMS NBR	NON-MA ITEMS PCT	EOQ ITEMS NBR	EOQ ITEMS PCT	EQMT ITEMS NBR	EQMT ITEMS PCT	TOTAL NBR	TOTAL PCT
A-NO STK LVL-NO DEMANDS	1696	21	5309	51	3	100	7009	38
B-NO STK LVL-W/DEMANDS	760	9	1295	12	0	0	2055	11
C-IM/SM PROHIBITS LVL	5	0	5	0	0	0	10	0
D-BASE DECISION-NO LVL	5	0	38	0	0	0	43	0
F-FULL STK-D BALANCE	33	0	56	0	0	0	89	0
G-FULL STK-ASSETS A&P	311	3	4	0	0	0	315	1
H-< FULL STK-RQN > STD	3774	48	1839	17	0	0	5613	31
J-< FULL STK-RQN < STD	522	6	1238	12	0	0	1760	9
K-< FULL STK-NO DUE-IN	209	2	470	4	0	0	679	3
P-COMMAND UNIQUE	52	0	0	0	0	0	52	0
R-FULL STK-INACCESSIBLE	441	5	3	0	0	0	444	2
Z-INITIAL SHORTAGE	34	0	2	0	0	0	36	0
TOTAL	7842		10259		3		18104	

DELETE

ATION	367	2	554	4	1	20	922	3
/OTH SVCS	4799	26	2292	23	4	80	7095	24
	191	1	3978	35	0	0	4159	14
	1471	8	1654	14	0	0	3125	10
ECLUDE	1306	7	290	2	0	0	1596	5
	35	0	265	2	0	0	302	1
ASSETS	450	2	543	4	0	0	993	3
ET USED	8878	49	1257	9	0	0	9935	34
TISFY	96	0	67	0	0	0	163	0
ER	334	1	545	4	0	0	879	3
	17917		11245		5		29167	

END

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